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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

1st Named Inventor: David T. Jennings III Serial No.: 10/620,115 Filed: 7/15/2003 Title: Constant-Current, Rail-Voltage Regulated Charging Electronic Detonator	Group Art Unit: 3641 Examiner: Troy Chambers
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DECLARATION UNDER 37 C.F.R. § 1.132

I, Gintong Teowee, do declare and state as follows:

1. All statements herein are made based on my own personal knowledge except where it is indicated that a statement is based on information and belief. All statements made of my own knowledge are true, and all statements made on information and belief are believed to be true.
2. I hold a B.S. in electrical engineering from the University of Rochester (1985), and a Ph.D. in materials science and engineering from the University of Arizona (1992). I worked in the automotive electronics industry for over seven years and have been working in the electronic detonator field for over two years.
3. I have closely reviewed and am familiar with the above-noted patent application ("this application"), including the twenty presently-pending claims. I have also reviewed the Office Action mailed on July 20, 2004 in this application ("the Office Action"), particularly the prior art rejections set forth on pages 2-3 therein. I have also reviewed the primary prior art references relied upon in those rejections, namely, U.S. Patent No. 3,752,081 to McKeown et al. ("McKeown") and U.S. Patent No. 5,460,093 to Prinz et al. ("Prinz").
4. McKeown discloses a "constant current source" (col. 5, lines 25-39), not a "constant current charging module" as claimed in claim 19. Even if other circuitry in the McKeown blasting machine is considered (e.g., those elements shown within power supply 1), there is no express or inherent disclosure to indicate that the components together provide a constant current charging of the blasting machine's storage capacitor 153. In fact, it appears impossible that the disclosed circuitry could result in such charging. Moreover, the constant current source disclosed in McKeown is for use in a blasting machine, and is not "for use in an electronic detonator" as claimed in claim 19. The two different applications necessitate substantial, material, and structural differences.
5. The Office Action (at pages 2-3) supports the propriety of combining Prinz and McKeown to reject claims 1-10, 12-17, 19 and 20 as obvious with the statement that the "suggestion/motivation for doing so would have been to charge a capacitor to 200 joules within 10 seconds and to 400 joules within 20 seconds." Such a suggestion/motivation is untenable because - while certainly relevant to a blasting machine - it is not relevant to the pyrotechnic devices such as taught by Prinz that are operated by a blasting machine. Indeed, 200 or 400 joules is many orders of magnitude higher than the capacitor in a pyrotechnic device such as is taught in Prinz is charged. The preferred firing capacitor in Prinz is 60-80 μ F and charged to 22V (col. 7, lines 1-34), and the firing capacitor disclosed as preferred in the present application is 47-374 μ F charged to 25V. (Paragraph 62). Such capacitors thus charged have no more than a 117mJ charge. In fact, modifying the teachings of Prinz to include a constant current source (or even a charging module)


for the stated motivation of charging a capacitor to 200 or 400 joules could never result in a workable device. A firing capacitor charged to 200 or 400 joules could not safely be placed in a pyrotechnic device such as the type taught by Prinz, and there is no reason to charge a capacitor in such a device to 200 or 400 joules in any period of time.

6. Even viewed more broadly than in the Office Action, the only suggestion/motivation that can be found in McKeown for its optional use of a constant current source is to ameliorate the effects of battery deterioration. (Col. 5, lines 25-36). But that suggestion/motivation is inapposite to the context of the pyrotechnic devices and manner of charging them as in Prinz and as claimed. First, there is no motivation to put a constant current source in each of the pyrotechnic devices for the purpose of ameliorating deterioration of the blasting machine's battery, because one of ordinary skill would have readily recognized that blasting machine battery deterioration must be fully addressed within the blaster itself (e.g., with a constant current source as in McKeown). For one thing, the system would otherwise have to operate on unpredictable, varying voltages supplied to the bus by the blasting machine, which is not practical. Further, one of ordinary skill in the art would certainly desire not to add more complexity and circuits to pyrotechnic devices as taught in Prinz if the issue could be addressed centrally in the blasting machine.

7. Second, there was no motivation to put a constant current source in each of the pyrotechnic devices for the purpose of ameliorating deterioration of the pyrotechnic device's firing energy storage module. Prinz teaches a firing capacitor, but even if the firing energy storage module were a battery, there would be no motivation to modify that to be a constant current source within the pyrotechnic device. This is because the deterioration of a firing storage energy battery in such a device would likely be too insignificant over its rated operating life to warrant adding any circuitry in the pyrotechnic device to address it, and even if deterioration were desired to be addressed with circuitry within the pyrotechnic device, one of ordinary skill in the art would use voltage regulating – not constant current – circuitry to rectify the battery's output. Likewise, even if its firing energy storage module were a battery, there would also be no motivation to modify a pyrotechnic device such as taught by Prinz to permit *charging of* that battery with a constant current source within the pyrotechnic device, because any charge-topping required in such a battery would be too negligible.

8. Third, with respect to claims 4-9 and 13-18, each of those claims are limited to a firing energy storage module that is a capacitor (not a battery), so the broad motivation of ameliorating the effects of battery deterioration is irrelevant to them by definition. One of ordinary skill in the art would have recognized that a capacitor does not suffer *battery* deterioration or indeed any deterioration in output that is significant enough in the context of such a pyrotechnic device to warrant adding circuitry to ameliorate the effects of deterioration.

9. I understand that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001), and may jeopardize the validity of this patent application or any patent issuing thereon.



Gintorg Teowee

Date: Oct 19, 2004